CURRENT LITERATURE.

NOTES FOR STUDENTS.

ALFRED J. EWART[1] continues to hold it as proved, in spite of Kny's objections, that isolated chlorophlastids may continue to assimilate for a short time after removal from the parent cell.—J. M. C.

IN HIS INTRODUCTORY presentatation of the pteridophytes, Sadebeck[2] outlines five main groups, FILICALES, SPHENOPHYLLALES, EQUISETALES, LYCOPODIALES, and CYCADOFILICES. The three groups of FILICALES are *Fil. leptosporangiatæ* (with the natural isosporous and heterosporous subdivisions), *Marattiales*, and *Ophioglossales*. The EQUISETALES are subdivided, on the basis of isospory and heterospory, into *Euequisetales* and *Calamariales*. The LYCOPODIALES have as their main divisions *Lyc. eligulatæ* and *Lyc. ligulatæ;* the subdivisions of the former being *Psilotineæ* and *Lycopodiineæ;* of the latter, *Selaginellineæ*, *Lepidophytineæ*, and *Isoetineæ*. The taxonomist who delights in uniformity of group names, and also names that indicate the rank of groups, will not be pleased.—J. M. C.

THE INTERESTING discovery of a set of the plants collected on the Lewis and Clark expedition and named by Pursh forms the subject of a paper by Mr. Thomas Meehan.[3] Pursh in his *Flora* refers to 119 as having been collected, many of which were new. The fate of the collection was unknown, the general understanding being that Pursh took the plants to England, and left them to Lambert, an officer of the Linnean Society, and that upon the distribution of Lambert's herbarium the plants were scattered. The occurrence of a large number of types in the collection made the loss of it a serious one. It seems that two years ago Professor C. S. Sargent suggested to Mr. Meehan that some of the material might be in the custody of the American Philosophical Society. After a long search the original packages were found unopened, some of them in bad condition, but the collection as a whole fairly preserved. Pursh's labels and notes made the discovery certain. The collection was sent to the Gray Herbarium for final identification, and Mr. Meehan includes in his account the very full and satisfactory report by Dr. B. L. Robinson and Mr. J. M. Greenman. Several interesting discoveries were made which will correct certain current identifications. In presenting the report parallel columns are used, one giving the present name of the plant, the other the treatment of the plant in Pursh's *Flora*. The discovery

[1] Bot. Centralbl. **75**: 33–36. 1898.

[2] Engler and Prantl's "Die Natürlichen Pflanzenfamilien" 1[4]: 1–48. 1898.

[3] Proc. Acad. Nat. Sci. Philad. 12–49. 1898.

of this important collection of North American plants and its deposit in the Academy of Sciences of Philadelphia is a matter of congratulation among taxonomists.—J. M. C.

MR. HENRY H. DIXON[4] has published recently some very interesting papers upon transpiration, which deal with the results of experiments which satisfy the author that transpiration is a "vital" process rather than a physical one. By "vital" processes he means "those which cannot be accounted for by the immediate energy-relations of the organism to the external world, but those in which energy previously stored by the organism, *e. g.*, oxidizable materials, is utilized, and which only take place during the life of the organism." During transpiration, therefore, the elevation of water in the vessels resembles the raising of water in plants by root pressure. The phenomena of transpiration responded sufficiently to oxygen and to anæsthetics to suggest that it is connected with vital phenomena. The conclusions drawn from experiments in a saturated atmosphere are as follows:

1. The elevation of the water of the transpiration current, when the leaves are surrounded with a saturated atmosphere, is effected by pumping actions proceeding in the living cells of the leaves.

2. The observations on the drying back of branches furnished with dead leaves renders it highly probable that these vital pumping actions are partially or wholly responsible for the elevation of water even in an unsaturated atmosphere.

3. These pumping actions are capable of raising the water against an external hydrostatic pressure.

4. In common with other vital actions, they are accelerated by a moderately high temperature, and are dependent on the supply of oxygen.

5. The cells adjoining the terminal portions of the water conduits appear to possess this activity, and, in plants provided with water-glands, the pumping actions are not limited to the secreting tissues of these glands.—J. M. C.

THE GENETIC RELATIONSHIPS between the phanerogams and cryptogams in the light of the most recent investigations are discussed by Belajeff.[5] As the title would indicate, the paper presents no new facts. Little attention is paid to the sporophyte, but the evolution of the male and female gametophyte, from the bryophytes to the spermatophytes, is presented in a masterly way. The female gametophyte shows a gradual transition from independence in the bryophytes to complete dependence in the gymnosperms and angiosperms, and the archegonia which it bears show a gradual transition from forms with the neck and venter free to forms with the entire archego-

[4] On the effects of stimulative and anæsthetic gases on transpiration, Proc. Roy. Irish Acad. III. **4**: 618–626. 1898; Transpiration into a saturated atmosphere, *l. c.* 627–635.

[5] Biol. Centralbl. **18**: 209–218. 1898.

nium imbedded. The homologies of the embryo sac structures of the angiosperms are not yet cleared up.

Up to 1885 there is nothing in literature to justify the assumption of such a gradual transition in case of the male gametophyte. Belajeff investigated antheridia of Selaginella and Isoetes in 1885, and the antheridia of the heterosporous Filicineæ in 1890. The small cell cut off from the germinating spore of Selaginella and Isoetes is the male gametophyte, the homologue of the prothallium which bears the antheridia in the homosporous Filicineæ. The antheridium which this much reduced gametophyte bears consists of several peripheral cells forming a wall enclosing inner cells in which spermatozoids are formed. The peripheral cells later coalesce. In the heterosporous Filicineæ the more complex male gametophyte shows that the transition from cryptogams to phanerogams is not to be sought here but rather in the heterosporous lycopods.

In the gymnosperms Belajeff investigated only the conifers. In the Abietineæ the small cells cut off from the germinating microspore represent the male gametophyte. The rest of the spore consists of an inner small cell surrounded by a large outer cell which develops the pollen tube. The inner cell divides into two, the hindmost of which disorganizes; the other again divides, giving rise to two cells which are the homologues of the mother cells of the antheridia of Selaginella and Isoetes. In the Cupressineæ the male gametophyte is entirely suppressed, the pollen grain transforming itself directly into an antheridium. In the Taxineæ the simplification is carried still further.

In the angiosperms the conditions are the same as in the Cupressineæ, the pollen grain dividing into two cells, the larger representing the antheridium wall, which stretches into a tube, the smaller dividing into two generative cells.

In 1897 the studies of Ikeno and Hirase threw new light upon the relationships of the cryptogams and phanerogams. Hirase found that the two generative cells in the pollen tube of Gingko develop into ciliated spermatozoids, and Ikeno made the same discovery in Cycas. Webber recently made similar observations on Zamia, his description of the development of the spermatozoids corresponding with Belajeff's description of these structures in Equisetum and ferns, thus adding another proof of the relationship between the cryptogams and cycads. Of course these observations break down the old division into zoidiogams and siphonogams, since Cycas, Gingko, and Zamia would belong to both groups. — CHAS. J. CHAMBERLAIN.

ITEMS OF TAXONOMIC INTEREST are as follows: Recent numbers of the *Bulletin of the Torrey Botanical Club* contain descriptions of new species of Asclepias and a recasting of *A. verticillata* and its allies, by Anna Murray Vail (**25**: 171–182. 1898); some new species of liverworts, with two plates, by Marshall A. Howe (*l. c.* 183–192); descriptions of various new species

from the west, with three plates, by A. A. Heller (*l. c.* 193–201, 265–271); descriptions of various new Wyoming plants, with plate, by Aven Nelson (*l. c.* 202–206, 275–284, 373–381); a revision of the N. Am. Eurhynchia, by A. J. Grout (*l. c.* 221–256), in which *Cirriphyllum* is proposed as a new genus including the species (four) with the concave filiform-tipped leaves, *Bryhnia* Kawin recognized to include two species with papillose leaves, and *Eurhynchium* retained to include the remaining nine species, one of which is new; miscellaneous new plants from New Mexico, by E. O. Wooton (*l. c.* 257–264, 304–310); miscellaneous new plants, by John K. Small (*l. c.* 316–320); about three dozen new fungi, by Chas. H. Peck (*l. c.* 321–328, 368–372); a presentation of the genus *Syntherisma* (often called the Digitaria section of Panicum) in North America, by George V. Nash (*l. c.* 289–303), twelve species being recognized, two of which are new, and most of the others with new combinations.—M. L. Fernald (*Proc. Boston Soc. Nat. Hist.* **28**: 237–249. 1898) has been studying the much discussed genus Antennaria and presents a synopsis of the New England species, all included in our manuals under the "polymorphous" *A. plantaginifolia*, recognizing thirteen species and varieties. The same author (*Erythea* **6**: 41–51. 1898) has also attacked the species complex known as *Castilleia parviflora*, and recognizes fourteen species and varieties, eleven of which are new.—C. V. Piper (*Erythea* **6**: 29–32. 1898) has recently described some miscellaneous new species from Washington.—B. L. Robinson (*Proc. Am. Acad.* **33**: 305–334. 1898) has published revisions of Mimosa and Neptunia. The North American and Mexican species of Mimosa are presented, sixty-seven being recognized, nine of which are new. A new subgenus, ASTATANDRA, is established to include *M. tequilana* Wats. Four North American species of Neptunia are recognized, one of which is new.—J. M. Greenman (*Proc. Amer. Acad.* **33**: 455–470. 1898) has published revisions of Galium and Relbunium, so far as species of Mexico and Central America are concerned. Twenty-five species of Galium are included as belonging to the region, five of which are new. Relbunium, included by Dr. Gray in Galium, includes seven species, one of which is new. The same author (*l. c.* 471–489) has also described numerous miscellaneous new and critical species from Mexico. —W. Willard Ashe (*Jour. Elisha Mitchell Sci. Soc.* **14**: 51–54. 1898) has described a new Robinia (*R. Boyntonii*) from the southern Alleghanies. —E. L. Greene (*Pittonia* **3**: 313–328. 1898) has recently described six more new species of Viola, five new forms of Antennaria, six new species of Convolvulus, and reëstablishes Rafinesque's *Polycodium*, including the *stamineum* group of Vaccinium (six species), and Nuttall's *Batodendron*, with *V. arboreum* as a type and two new species.—Dr. A. Weber continues his publications on Cactaceæ (*Bull. du Mus. d'hist. nat.* 1898; nos. 2 and 3), dealing with the genus Echinocactus in Lower California, and with Pereskia and the Pereskia-like opuntias of Mexico.—J. M. C.